

Message Text

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DEPT PLS PASS NUCLEAR REGULATORY COMMISSION, NATIONAL SECURITY
COUNCIL

E.O. 11652: N/A

TAGS: TECH, TBIO, ENRG, JA

SUBJECT: USE OF ALGAE FOR FIRST STAGE HEAVY WATER PRODUCTION

1. A PROCESS FOR ENRICHING HEAVY WATER TO GREATER THAN 1 PCT HAS BEEN DEVELOPED BY A JAPANESE BIOPHYSICIST. IT USES CERTAIN STRAINS OF ALGAE GROWN UNDER ARTIFICIAL PHOTOSYNTHETIC CONDITIONS IN A CLOSED NUTRIENT CYCLE. THE ALGAE LITERALLY CONCENTRATE HEAVY WATER WITHIN THEIR CELL WALLS, AND A PORTION OF THE CULTURE MEDIUM ALSO BECOMES ENRICHED IN HEAVY WATER. WATER FRACTIONS RECOVERED FROM THESE TWO SOURCES ARE THEN FURTHER ENRICHED BY A LOW-TEMPERATURE ULTRACENTRIFUGATION PROCESS. CONCENTRATIONS OF ABOUT 1.5 PCT HAVE BEEN ACHIEVED SO FAR. THEORETICALLY, CONCENTRATIONS APPROACHING 20 PCT APPEAR TO BE FEASIBLE BY THE USE OF NUTRIENT RECCLE, PROVIDED THAT THE ALGAE CAN SURVIVE THE PRESENCE OF SIMULTANEOUSLY INCREASED CONCENTRATIONS OF TOXIC IMPURITIES.

2. WHAT WAS ORIGINALLY A UNIVERSITY BASIC RESEARCH PROGRAM IS NOW BEING FUNDED ON A COMMERCIAL BASIS BY THE POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION (PNC) AND THREE LARGE PILOT PLANTS ARE NOW IN CONSTRUCTION OR OPERATION. AN ORAL PAPER HAS BEEN GIVEN ON THIS SUBJECT
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BY THE JAPANESE SCIENTIST BEFORE THE ATOMIC ENERGY SOCIETY

OF JAPAN AND THE PAPER IS NOW IN PRESS. EXCEPT FOR A BRIEF NEWS STORY IN A JAPANESE NEWSPAPER ON FEBRUARY 4, THERE HAS BEEN NO OTHER PUBLICATION OF THE RESULTS OBTAINED. A JAPANESE PATENT ON THE PROCESS WAS ISSUED ABOUT THREE YEARS AGO.

3. COMMENT: IN THE JUDGMENT OF THE EMBASSY'S SCICOUNS, THE PROCESS APPEARS TO BE SOUND ECONOMICALLY, SINCE THE ALGAE ARE BEING GROWN FOR THEIR VALUE AS A FOOD SUPPLEMENT, WITH THE PARTIALLY ENRICHED HEAVY WATER BEING A BY-PRODUCT. MOST OF THE COMPLEXITY OF HEAVY WATER PRODUCTION IS CONNECTED WITH INCREASING THE CONCENTRATION FROM THE LEVEL FOUND IN NATURE TO THE ORDER OF A FEW PER CENT, AND THE ALGAE PROCESS COULD OPEN UP A PATH FOR ALMOST ANY COUNTRY TO ENGAGE IN HEAVY WATER PRODUCTION ON WHATEVER SCALE IT DESIRES. SCICOUNS HAS HAD EXTENSIVE DISCUSSIONS WITH INVENTOR OF PROCESS AND CAN PROVIDE DETAILED DESCRIPTION OF PROCESS IF WASHINGTON AGENCIES INTERESTED. HODGSON

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